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SYNTHETIC FEED MILK SUBSTITUTE, IN PARTICULAR MILK FOR DOGS

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Description

The subject matter of the present invention relates to a synthetic feed milk substitute, in particular milk for dogs, according to the precharacterizing clause of Claim 1.

Synthetic feed milk substitutes, in particular milks for dogs, are well-known and are based primarily on dry milk or whey powder, milk proteins, fats, and half-finished products in the form of vitamins, minerals, trace elements and the like.

All of the known milks for dogs are marked by an excessively high milk powder or whey powder fraction, ranging overall from more than 60% up to a maximum of 85%. Such milks for dogs which, as a rule, are altered calf's milks, have considerable disadvantages if they are used as the exclusive feed for whelps. It was found that when whelps are fed with this type of milk for dogs they sometimes suffer from life-threatening diarrhea and, moreover, that these milks have too low a nutrient value for use in feeding whelps.

For this reason, in cases where the dogs are raised without the mother animal, they must be fed the known milks for dogs many times, such as approximately every two hours, throughout the day and night, which is hardly practicable.

DE-B-1 219 318 describes a filter [sic; feed] milk substitute for dogs which consists of cow's milk and additives and which is as close as possible to the composition of natural dog's milk.

Thus, the problem to be solved by the present invention is to make available a synthetic feed milk substitute on the basis of cow's milk for raising carnivorous animals, in particular a milk for dogs, which is suitable for use as an exclusive feed for young animals and thus can be practially used to raise the animals without the mother animal.

This problem is solved according to the present invention by the features contained in the characterizing clause of Claim 1.

As provided by a first embodiment of the present invention, the milk powder fraction of the feed is considerably reduced, i.e., to a fraction of less than 60 wt% and especially less than 45 wt%. The resulting deficit is made up by other milk proteins which are additionally added, i.e., by milk proteins with a low lactose content but an extremely high raw protein content. This measure takes into consideration the fact that the disadvantage of the milks for dogs known so far was primarily attributable to the high lactose content which, in turn, is attributable to the high fraction of skim milk powder and/or whey powder in the synthetic feed milk substitute. According to a second embodiment, milk powder is not used at all and, instead, a completely desweetened milk and/or whey protein powder is used as the basis of the feed. These protein concentrates in the form of a powder can be manufactured by means of ultrafiltration and similar processes. This makes it possible to considerably minimize the lactose content of the feed, i.e., of the milk for dogs. Yet another embodiment provides for a reduction of the milk powder in combination with a completely desweetened milk and/or whey protein powder.

As provided by the present invention, the lactose fraction of the product can be reduced to less than 30% and preferably to 1 to 25%. At the same time, the raw protein content can be increased to more than 30% and preferably to 31 to 40%. As a result of the reduction of the fraction of skim milk powder, the skim milk functions and is used mainly as the carrier of fat, while the lactose fraction is controlled by the appropriate addition of milk proteins.

The milk proteins used are preferably whey proteins that are obtained by means of ultrafiltration, in particular soluble nondenatured proteins comprising the fractions
beta-lactoglobulin
alpha-lactalbumin
serum albumin
immunoglobulins
protease-peptone fraction.

During the ultrafiltration, the whey is turbulently passed over the surface of membranes. Through the action of a hydrostatic pressure, water, lactose, salts and low-molecular substances

permeate [through the membranes] while the high-molecular substances, such as the whey proteins, are retained. Thus, it is mainly the lactose that is removed so that broken-down protein fractions obtained from milk protein are added to make up for the reduced fraction of skim milk powder. For this, whey proteins with 1 to 10% of lactose, preferably whey proteins with up to 1% of lactose, are used. In addition, milk proteins in the form of caseins are added, in particular sodium, potassium, calcium caseins or acid caseins. These are best obtained by means of precipitation from skim milk with acids, washing, mechanical separation and special drying. It is also possible to use rennet casein which is obtained by means of enzymatic precipitation from skim milk, washing, mechanical separation and special drying.

The advantage of the measures according to the present invention is to be seen in the fact that as a result of the use of these milk proteins, the reduction of the lactose fraction of the synthetic feed aimed at is achieved while at the same time only milk proteins are used.

According to the present invention, the albumin-globulin ratio relative to the casein fraction is accurately adjusted from 2.1 to 3.0:4.1 to 5.0.

To compensate for potential natural variations in the raw protein component, it is useful to add pure amino acids. Especially suitable for this purpose are methionine, lysine and cystine, preferably in quantities of up to 2% of the overall formulation. It is especially useful to adjust the ratio of lysine to methionine to approximately 3.1%:1.65%.

The raw fat content of the synthetic milk is preferably higher than 25%, and especially preferred is a content of 25.5 to 40%.

Preferably, short-chain fatty acids, from C-12 on, and only small fractions of long chain fatty acids with C-20 and higher (less than 0.5%) are used.

An especially preferred fatty acid distribution is obtained as follows:

C-12	0.1 to 0.5 parts by weight
C-14	2.0 to 10.0 parts by weight
C-16	20.0 to 41.0 parts by weight
C-16/1	1.3 to 6.0 parts by weight
CC-18	2.4 to 29.0 parts by weight
C-18/1	25.0 to 48.0 parts by weight
C-18/2	2.5 to 15.0 parts by weight
C-18/3	0.2 to 3.0 parts by weight
C-29/0	and higher at most 1 part by weight (sum total of 100 parts by weight).

In addition, it is also useful to add an emulsifying agent and an antioxidant to the fat composition. For this purpose, the conventional emulsifying agents can be used as emulsifiers, such as fatty acid monoglyceride diglycerides, esters of fatty acid monoglycerides, sugar fatty

acid esters, native or modified lecithin or mixtures thereof. Antioxidants to be used for this purpose can also be chosen from those conventionally used, such as ethoxyquine and/or BHT.

Examples of the fat fraction of the synthetic feed milk follow from the table below:

	All values in %							
Fat formula	1	2	3	4	5	6	7	8
Beef tallow	30	80	-	90	75	50	-	-
Soybean oil	10	18	5	8	20	20	10	18
Lard	-	-	20	-	3	18	-	-
Sunflower oil	5	-	10	-	-	-	-	-
Bone grease	53	-	60	-	-	-	88	70
Emulsifier + Antioxidant	2	2	5	2	2	2	2	2
Total	100%							

Preferred fatty acids are myristic acid, palmitic acid, palmitolic acid, stearic acid, oleic acid, linoleic acid and linolenic acid.

To improve the tolerability of the synthetic milk for dogs, lactobacilli are added, preferably lactobacillus acidophilus and lactobacillus bifidus, in a quantity of 10^6 bacilli per 100 g of milk or 0.05-1% dry feed relative to the overall formulation.

Other additives are pectins or tannins in a quantity of 0.001 to 0.5%.

Below, examples of the feed according to the present invention will be described:

Example 1

30% Skim milk powder
30% Fat
20% Whey protein with 1% lactose fraction
15% Caseins
5% Half-finished products (consisting of vitamins, minerals, trace elements, addition of amino acids).

This formulation has a lactose fraction of 15.8%, a raw protein fraction of 39% and a fraction of raw fat of 30%.

Example 2

40% Skim milk powder
35% Fat

10% Whey protein
10% Caseins
5% Half-finished products

The formulation has a lactose content of 21%, a content of raw protein of 30.5%, and a raw fat fraction of 35.5%.

Example 3

41% Skim milk powder
27% Raw fat
16% Whey protein
11% Caseins
5% Half-finished products

This preferred formulation has a lactose fraction of 21.2% and a raw protein fraction of 36.2%.

In the examples given, the biological valence of the raw protein component is on the average 92 and the PER value is 3.2.

Example 4

31.0% Whey protein powder
33% Raw fat
21.8% Casein
7.0% Raw ash
0.1% Raw fibers
1.35% Methionine
1.2% Calcium
0.9% Phosphorus
3.0% Lysine
13.2% Albumin

and vitamin A (25,000 IU), vitamin E (200 mg) and vitamin D3 (3,000 IU) as well as residues and trace elements.

This formulation has a raw protein fraction of 36.5% and a lactose fraction of less than 4%. The nutrient value is approximately 7,200 kcal or 30,300 kJ.

Example 5

30.0% Dry milk powder
31.3% Fat

20.7% Casein
7,4% Raw ash
1.31% Methionine
1.34% Calcium
0.86% Phosphorus
3.02% Lysine
10.5% Albumin
and the following vitamins: vitamin A (25,000 IU), vitamin E (200 mg), and vitamin D_3 (3,000 IU) as well as residues and trace elements.

This formulation has a raw protein fraction of 33.3% and a lactose fraction of 17.3%. The nutrient value is approximately 6,500 kcal or 27,300 kJ.

Example 6

30% completely desweetened milk protein
25% completely desweetened whey protein
32.5% mixture of fats
2.5% emulsifying agent
10% half-finished products

The formulation according to the present invention is notable for the fact that it is as close as possible to the milk of the mother animal, thus making it possible to raise animals largely without the mother animal with the synthetic feed, and by an extremely simple production. The feed is marked by a very high nutrient value, i.e., approximately 30,000 kJ per kg of dry substance, which means that a complete caloric substitute for the mother's milk is ensured. Whelps now need to be fed only three to four times per day, starting on the first day of life. Accurately maintaining the content of essential amino acids and protein components and matching the fatty acid pattern to that of the mother's milk as much as possible further ensures that the milk can be used to raise carnivorous animals, in particular dogs and cats, without the mother animals.

The percentage values used refer to percent by weight.